Fever and Neutropenia in the Child with Cancer
(Amended July, 2006)

1. Background

The etiology of fever in most children with cancer hospitalized for febrile neutropenia is unknown. A localized bacterial infection or bacteremia has been demonstrated in 10-40% of patients. In a study from Dallas on 104 febrile neutropenic children with cancer[1] 26 children (25%) had clinical infections (i.e. pharyngitis, bronchitis, sinusitis, etc) and 10 (11%) had proven bacteremias. Seven of the 11 isolates (one patient had 2 pathogens) were gram-positive and 4 were gram -negative bacteria.

The initial empirical treatment of the child with fever and neutropenia should be according to their clinical risk category (i.e. low-risk vs. high-risk). The traditional approach of using a combination of two or three antibiotics is still appropriate for the high-risk patients. Monotherapy with third- or fourth-generation cephalosporins (i.e. ceftazidime or cefepime, respectively) or carbapenems (i.e. imipenem, meropenem) is considered to be adequate initial empirical treatment for the non-high risk, "uncomplicated" patients [2,3]. Ceftazidime has excellent gram-negative coverage but limited or no activity against most gram-positive organisms. Cefepime and carbapenems have activity against gram negative bacteria, as well as most strains of pneumococci and Streptococcus viridans. Carbapenems also have activity against anaerobic pathogens. Of the two-carbapenem antibiotics, meropenem is preferred over imipenem because of its fewer side effects, especially G.I. (i.e less nausea or vomiting) and CNS toxicity (i.e. no seizures).

A randomized study1 of cefepime versus ceftazidime in children with febrile neutropenia showed a response rate of 74 % and 70 %, respectively, among 68 evaluable patients. Addition of vancomycin and other antibiotics was required in 12 % of the cefepime-treated patients and 14 % of the ceftazidime-treated patients. Of note is that 6 of the 8 patients with staph coagulase-negative isolates were randomized to treatment with ceftazidime.

Among the risk factors in febrile neutropenic patients, oral mucositis and prior treatment with high-dose Ara-C are risk factors for viridans streptococci bacteremia[4]. Clinically, this often manifests with very high fevers (i.e. temperature > 40 ° C) and tachypnea (? ARDS).

Microorganisms isolated from blood cultures of febrile neutropenic patients at Egleston and Scottish Rite hospitals (October 2001-October 2002) are shown in Appendices II and III, and sensitivities of these organisms in Appendix IV.

2 LOW-RISK PATIENTS

2.1 Definition of Fever and Neutropenia

2.1.1 ***Fever***: single oral temperature of 38.5 °C, or two temperature readings of 38 °C, one hour apart.

2.1.2 ***Neutropenia***: Absolute neutrophil count (ANC) of less than 500/uL or <1000/uL and falling.

2.2 Definition of Low-Risk Patients

2.2.1 Patient is not hospitalized at the onset of fever.
2.2.2 Patient has a solid tumor (including Hodgkins lymphoma), ALL in remission (Exception: high-risk B-ALL in consolidation), and NHL in remission.
2.2.3 Patient with neutropenia for less than 7 days.
2.2.4 Patient does not have comorbidity such as hypotension, tachypnea, or organ failure.
2.2.4 Patient does not have chills, pneumonia, cellulitis, (CVL) tunnel infection, or a portacath pocket infection.
2.2.5 Patient does not have **severe** GI mucositis
2.2.6 Patient does not have abdominal pain, perianal tenderness, or bloody diarrhea.
2.2.7 Patient has a temperature **< 39.5 °C.**
2.2.8 Patient with neutropenia anticipated to last less than 10 days.

2.3 Clinical Guidelines

2.3.1 Note associated symptoms: chills, abdominal pain, tachypnea, cough, height of temperature; history of allergy to antibiotics

2.3.2 Physical examination: Note hydration status, capillary refill; check for tenderness, erythema, and/or increased warmth of overlying skin over Broviac/Hickman line, portacath, peripheral IV lines, BM, and LP sites.

2.3.3 Pulse oximetry if patient has respiratory symptoms.

2.4 Laboratory Guidelines

2.4.1 CBC with differential, BUN, creatinine, electrolytes, ALT, bilirubin, total protein and albumin.

2.4.2 Blood cultures (4 cc for aerobic and 4 cc for anaerobic cultures) from

portacath or each lumen of the Broviac/Hickman lines.

2.4.3 If there is no central venous line device or unable to draw from it, obtain a peripheral blood culture (4 cc for each type of culture).

2.4.4 Peak and trough vancomycin and aminoglycoside levels around 3rd dose (if continuing with vancomycin is anticipated)

2.4.5 If clinically indicated: viral respiratory panel (by direct fluorescent antibody, DFA) or respiratory viral cultures for adenovirus, influenza A and B, parainfluenza types 1,2, and 3, adenovirus, and RSV; or swab of oral/perioral lesions for HSV DFA and/or culture, throat culture, and urine culture.

2.4.6 Spinal tap to rule in/out meningitis, if clinically indicated.

2.5 Imaging Studies

2.5.1 Chest-x-ray: If clinically indicated, i.e. patient has cough, tachypnea, or oxygen requirement.

2.6 Treatment Guidelines

2.6.1 ***Supportive Measures*:**

2.6.1.1 IV fluids 1 ½ maintenance. If patient has poor capillary refill and/or hypotension, administer a normal saline (NS) bolus, i.e. 20 cc/kg. Repeat NS bolus x 2 if necessary to correct hypotension. If patient has hypoalbuminemia (i.e.< 3 g/dL) or anemia, consider use of 5 % albumin or packed red cells (in addition to NS boluses x 2), respectively, for more effective volume expansion.

2.6.1.2 If hypotension does not respond to adequate volume replacement, patient isto be admitted to PICU.

2.6.1.3 Stop chemotherapy (i.e. oral 6-MP, MTX)

2.6.1.4 Continue with G-CSF

2.6.2 ***Initial Antibiotic Treatment***

2.6.2.1 Consider treatment with

- **Ceftazidime** 50 mg/kg/dose (max. dose 2 gm) IV Q 8 h (*****)

(*)2.6.2.2 If patient **has a history of severe allergic reaction (with anaphylaxis or not) due** to cephalosporins or penicillin, consider treatment with:

• **Tobramycin** at conventional dose/schedules: 2.5 – 3 mg/kg/dose (max dose:140 mg) IV Q 8 hr, and

• **Vancomycin** 20 mg/kg/dose (maximum dose 1 gm) IV Q 8 hr*****

(*) An alternative to using vancomycin would be **Levofloxacin** (*levoquin*). Dose: If child is < 5 yr (and > 6 mo) 10 mg/kg/dose Q 12 hr. If child is >5 yr of age 10 mg/kg/dose Q 24 hr.

2.6.3 ***Treatment Modifications*:**

2.6.3.1 Patient with positive blood cultures:

• Treat according to blood culture results and sensitivities. Consider providing broad coverage until patient has become afebrile and has a rising phagocyte count (i.e. ≥ 200/uL, then continue with antibiotic (s) as per sensitivity results.

• *Do not use vancomycin* if patient can be adequately treated with other antibiotics.

2.6.3.2 If clinical deterioration occurs while patient is on ceftazidime alone, discontinue ceftazidime and provide triple antibiotic treatment with:

• **Meropenem** 20 mg/kg/dose (maximum dose 2 gm) IV Q 8 hr.

• **Vancomycin** 20 mg/kg/dose (maximum dose 1 gm) IV Q 8 hr, and

• **Amikacin** 7.5 – 10 mg/kg/dose IV Q 8 hr (maximum dose 500 mg/dose) IV Q 8 hr, or

2.6.3.3 Fever persisting beyond 72 hr of ceftazidime ± other antibiotics but patient is clinically stable:

• Rule out nonbacterial causes for fever

• Consider consulting with Infectious Disease (ID) service. D**o not add vancomycin for persistent fever unless there is clinical or culture evidence of gram-positive infection.**

2.6.3.4 Fever persisting beyond 5 days of ceftazidime ± other antibiotics:

2.6.3.4.1 **Consider empirical antifungal-treatment with ambisome (or abelcet) 3 mg/kg/day. If patient has renal insufficiency or is allergic to these drugs, consider using:**

2.6.3.4.2 **If child is > 2 years of age,** *caspofungin (cancidas)**** 70 mg/m2 IV as loading dose (max 70 mg), then 50 mg/m2/day IV (max 70 mg).**

2.6.3.4.3 **If child is < 2 years of age consider** *voriconazole***** at 7 mg/kg/dose Q 12 hr IV.**

(*Note:* For d*ose of voricanozale for children > 12 yr of age see Chapter on Common Fungal Infectionsr)*

2.6.3.4.4 Administer a normal saline bolus (i.e.10 - 20 cc/kg) prior to infusion of ***ambisome or abelcet.***

(*****) *Because the concomitant use of caspofungin and cyclosporine-A may increase risk for caspofungin-induced hepatotoxicity, serum transaminases should be monitored closely (at least twice a week). Caspofungin should be discontinued if moderate to severe transaminitis occurs.*

Consult clinical pharmacist for caspofungin dose adjustment if patient is on cyclosporine, rifampin, phentoin, dexamethasone or carbamazepine.

(**)Consult with clinical pharmacist for dosing if patients is on phentoin, cyclosporine, or tacrolimus.

See Antifungal Medications Table (Appendix II, Chapter Common Fungal Infections) for drug interactions.

3 HIGH-RISK PATIENTS

3.1 Definition of Fever and Neutropenia

3.1.1 As defined on 2.1.1 and 2.1.2

3.2 *Definition of High-Risk Patients*

3.2.1 Patients with AML
3.2.2 Patients with ALL or NonHodgkins lymphoma on induction therapy

3.2.3 Patients with **very** high-risk B-precursor ALL on consolidation therapy **and patients with relapsed B-ALL**
3.2.4 Patients receiving high-dose Ara-C treatment
3.2.5 Patients with hypotension, chills, tachypnea, or organ failure
3.2.6 **Patients with known history of MRSA colonization or infection**
3.2.7 Patients with significant abdominal pain (i.e. not due to constipation), perianal pain, bloody diarrhea
3.2.8 Patients with cellulitis, or clinically suspected CVL tunnel infection or portacath pocket infection
3.2.9 Patients with fever $\geq$ 40 °C
3.3.0 **Patients with personal or family history of recurrent skin abscesses**
3.3.1 **Patients with suspected septic arthritis or osteomyelitis**
3.3.0 Patients with known positive blood cultures for gram-positive organism (final report pending)

3.3 Clinical Guidelines

3.3.1 History and Physical examination: note for presence of chills, abdominal pain, watery or bloody stools; ill-appearance, location of abdominal pain, check for peritoneal signs, check for infection/inflammation of perianal area or CVL/ PAC sites.

3.4 Laboratory and Imaging Studies

3.4.1 CBC- diff, chemistries, blood cultures, vancomycin and aminoglycoside levels as per section 2.4.

3.4.2 If patient is on amphotericin-B, serum potassium should be checked daily prior to infusion (r/o hypokalemia); BUN, creatinine and all electrolytes should be checked twice a week.

3.4.3 If patient has diarrhea, stools for cultures, O & P, and clostridium difficile.

3.4.4 If patient has vaginal discharge and gonorrhea or chlamydia are suspected, nucleic acid by PCR for each organism should be obtained, from urine or vaginal/uretral discharge.

3.4.5 As clinically indicated: chest-x-ray, KUB and ultrasound (US) of abdomen (to rule out typhlitis), gallbladder US (to rule out gallstones, cholecystitis); CT scan of abdomen (to rule out typhlitis, appendicitis, ruptured viscus).

3.4.6 Spinal tap to rule out meningitis, if clinically indicated

3.5 *Initial Antibiotic Treatment*

3.5.1 Clinically Stable Patients:

3.5.1.2 **Ceftazidime*** 50 mg/kg/dose (max. dose 2 gm) IV Q 8 hr, and

3.5.1.3 **Vancomycin** 20 mg/kg/dose (max. dose 1 gm) IV Q 8 hr

For patients ***with history of severe allergic reactions to cephalosporin and/or penicillins, consider use of* :

3.5.1.4 **Tobramycin** instead of cefatazidime, 2.5 - 3.0 mg/kg/dose (max dose: 140 mg) IV Q 8 hr.

3.5.1.5 For patients **who become unstable** and/or those who develop symptoms/signs suggestive of intraabdominal infection (i.e. enterocolitis, typhlitis, etc) **while receiving above double coverage**, discontinue ceftazidime (or tobramycin) and start **meropenem and amikacin as per 3.5.2**. Continue with triple antibiotics until culture results are available and patient is clinically stable. **When these two criteria are met, continuing treatment with meropenem alone would probably suffice.**

3.5.2 Clinically Unstable (i.e.hypotension, tachypnea, chills) and/or Ill-looking Patients**

3.5.2.1 **Meropenem** , as per 2.6.3.2,

3.5.2.2 **Vancomycin**, as per 3.5.1.3, and

3.5.2.3 **Amikacin** as per 2.6.3.2

3.6 *Treatment Modifications*

3.6.1 Patient with negative blood cultures for gram-positive organisms and clinically stable: *Stop Vancomycin*.

3.6.2 Patients with positive blood cultures: Treat according to sensitivity data. Provide broad coverage until patient becomes afebrile and absolute phagocyte count is rising (i.e. APC >200/uL). *Do not use vancomycin* if patient can be adequately treated with alternative antibiotics.

3.6.3 Patients with PAC/CVL cultures positive for *Staph epidermidis* or other coagulase-negative species. **Repeat blood cultures and do CRP. If repeat BC is negative and CRP is low or normal and patient is clinically well, consider possibility of contaminant. If repeat blood cultures confirm Staph**

epidermidis, consider continuing treatment with vancomycin or an alternative antibiotic (i.e clindamycin)- according to sensitivities. Treat for a total of 10 days from the first negative blood culture.

3.6.4 Patient with persistently positive PAC/CVL blood cultures for *Staph epidermidis* or other coagulase-negative bacteria over 48 hr after the start of vancomycin therapy, consider:

a) Venogram of PAC/CVL (or "linogram"). If a clot (intraluminal or at tip of catheter) is demonstrated, treat with TPA according to protocol, and repeat cultures after 24 hr of antibiotics post- TPA treatment.

b) If venogram ("linogram") is negative consider adding rifampin (if bacteria is sensitive to it) 10 mg/kg/dose IV Q 12 hr, to be infused through the line.

3.6.4.1 Alternatively, remove infected catheter.

3.6.4.2 Consider consulting with ID

3.6.5 Patient with persistent fever over 72 hr but negative cultures:

3.6.5.1 Consider nonbacterial causes for fever.

3.6.5.2 Consult with ID

3.6.6 Patient with persistent positive blood cultures

3.6.6.1 Consult with ID

3.6.7 Patient with CVL tunnel or PAC pocket infection:

3.6.7.1 Remove central line device. Continue with appropriate antibiotic(s).

3.6.7.2 Consult with ID.

3.6.8 Patient with CVL/PAC infection due to candida, *Bacillus species*, vancomycin- resistant enterococci (VRE), *Stenotrophomonas maltophilia*, atypical mycobacteria, Stomatoccocus *mucilaginosa*, *Corynebacterium jeikeium*, *Acinetobacter species*:

3.6.8.1 Consider **r**emoval of central line device and placement of temporary line for continuation of antibiotics.

3.6.8.2 Consult with ID.

3.6.8.3 Continue with antibacterials or antifungals through temporary line for 7 - 14 days.

3.6.8.4 For candida infections, see chapter on Common Fungal & Viral Infections.

4. BLOOD AND MARROW TRANSPLANT PATIENTS

Consult BMT Guidelines

5. References

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2. Alexander SW, Walsh TS, Freifeld AG, Pizzo PA. In Pizzo and Poplack, Pediatric Infectious complications in Pediatric Cancer Patients. In Pizzo PA and Poplack DG (Eds): Principles and Practice of Pediatric Oncology 2002: 1239-1283, 4th Edition, Lippincott Williams and Wilkins, Philadelphia.

3. Hughes WT, Amstrong D, Bodey GP, et al. 2002 Guidelines for the Use of Antimicrobial Agne3ts in Neutropenic Patients with Cancer. Clin Infect Dis 2002; 34: 730-51

4. Weissman SJ, Scoopo FJ, Johnson GM, et al: Septicemia in Pediatric Oncology Patients: The Significance of Viridans Streptococcal Infections. J Clin Oncol 1990; 8: 453-459.

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6. Appendices: 4

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APPENDIX I

Guidelines for Management of Fever and Neutropenia in Oncology

Definition

Fever: oral temp ≥ 38.5 C x 1 or 38 C x2 one hr apart

Neutropenia: ANC < 500 or 1000 and falling

Low Risk Patients

a) Not hospitalized at onset of fever.
b) Solid tumor (including Hodgkins), ALL/NHL in remission (Exception: high-risk B-ALL in consolidation)
c) Neutropenia < 7 days duration.
d) No hypotension, tachypnea, or organ failure.
e) No chills, pneumonia, cellulitis, no CVL tunnel/PAC pocket infection
f) No severe GI mucositis
g)No abdominal pain, perianal tenderness, or bloody diarrhea.
h) Temperature < 39.5 °C.
i) Anticipated duration neutropenia < 10 days.

Treatment:

Ceftazidime*
50 mg/kg/dose (max 2 gm) IV Q 8 hr

If clinical deterioration occurs, treat as Clinically Unstable with meropenem (d/c CTZ), vancomycin, and amikacin

* If allergic to cephalosporins/penicillin:
consider **Tobramycin** 2.5 - 3 mg/kg/dose (max 140 mg) IV Q 8h plus **vancomycin** 20 mg/kg/dose IV Q 8 hr

High Risk Patients

a) **Patients with AML**
b) Patients with All or NHL on induction thera
c) Patients with very high risk B-ALL on consolidation or relapsed B-ALL
d) Patients received high-dose Ara-C treatment
e) Patients with hypotension, chills, tachypnea, or organ failure
f) Patients with known history of MRSA colonization or infection
g) Patients with cellulitis, suspected CVL tunnel or PAC pocket infection, suspected arthritis or osteomyelitis
h) Patients with significant abdominal pain, perianal pain, or bloody diarrhea.
i) Patients with temperature > 39.5 °C.
j) Patients with known positive blood cultures for gram+ organism (final report pending)

Treatment: Clinically Stable

Ceftazidime*
50 mg/kg/dose (max 2 gm) IV Q 8 hr
Vancomycin
20 mg/kg/dose (max 1 gm) IV Q 8h.

* If allergic to cephalosporins/penicillin:
consider **Tobramycin** 2.5 - 3 mg/kg/dose (max 140 mg) IV Q 8h instead of ceftazidime

Treatment: Clinically Unstable (hypotension, ill-looking)

Meropenem 20 mg/kg/dose (max 2 gm) IV Q 8 hr

Vancomycin 20 mg/kg/dose (max 1 gm) IV Q 8 hr

Amikacin 7.5 mg-10 mg/kg/dose (max 500 mg/dose) IV Q. 8 hr

APPENDIX II

CHOA-HEM/ONC/BMT SERVICES: EGLESTON BLOOD CULTURES (10/01-10/02)

ORGANISMS	COUNT	PERCENT
COAGULASE-NEGATIVE STAPH	104	54
STAPH AUREUS	27	14
STREP,VIRIDANS	19	10
PSEUDOMONAS SP	8	4
ENTEROCOCCUS FAECALIS	7	4
ACINETOBACTER	4	2
ENTEROBACTER CLOACAE	4	2
E. COLI	4	2
SERRATIA MARCESCENS	3	2
STREP PNEUMONIAE	3	2
CITROBACTER FREUNDII	2	1
RHODOTORULA	1	1
STREP, GROUPB	1	1
CANDIDA KRUSEI	1	1
STENOTROPHOMONAS MALTOPHIA	1	1
PROTEUS MIRABILIS	1	1
CANDIDA PARAPSILOSIS	1	1
KLEBSIELLA PNEUMONIAE	1	1
BACILLUS SP	1	1
KLEBSIELLA SP	1	1

APPENDIX III

CHOA-HEM/ONC/BMT SERVICES:
SCOTTISH RITE EGLESTON BLOOD CULTURES (10/01-10/02)

ORGANISMS	COUNT	PERCENT
COAGULASE-NEGATIVE STAPH	69	61
PSEUDOMONAS AERUGINOSA	9	8
STAPH AUREUS	9	8
E. COLI	5	4
ENTEROBACTER AGGLOMERANS	3	3
ENTEROCOCCUS FAECALIS	3	3
STREP PNEUMONIAE	3	3
MICROCOCCUS SP	3	3
STREP,VIRIDANS	2	2
KLEBSIELLA PNEUMONIAE	2	2
ACINETOBACTER	1	1
ENTEROBACTER CLOACAE	1	1
STENOTROPHOMONAS MALTOPHIA	1	1
CANDIDA PARAPSILOSIS	1	1
LEUCONOSTOC SP	1	1
PSEUDOMONAS SP	1	1

Method: All positive and negative blood cultures (lab IT) were combined. HEM/ONC/BMT patient roster was generated using attending MD numbers, MD names and listed diagnosis in the mirco lab. Positive and negative blood culture results were extracted using this roster. Duplicate isolates were excluded (duplicate was defined as same organism and sensitivity pattern; excel, SAS). Only patients with at least one onc diagnosis are presented (hem/BMT excluded).

APPENDIX IV

CHOA-HEM/ONC/BMT SERVICES: SCOTTISH RITE AND EGLESTON BLOOD CULTURES (10/01-10/02): ANTIBIOTIC SENSITIVITIES.

ALL GRAM NEGATIVES	**Resistant**		**Intermediate**		**Sensitive**		**Total**
AMIKACIN	1	2%	0	0%	51	98%	52
GENTAMICIN	1	2%	1	2%	50	96%	52
MEROPENEM	2	4%	0	0%	50	96%	52
TOBRAMICIN	1	2%	3	6%	48	92%	52
CIPRO	1	2%	4	8%	47	90%	52
CEFEPIME	6	12%	1	2%	45	87%	52
CEFTAZIDIME	5	10%	3	6%	44	85%	52
CEFOTAXIME	9	17%	6	12%	37	71%	52

PSEUDOMONAS AERUGINOSA	**Resistant**		**Intermediate**		**Sensitive**		**Total**
AMIKACIN	0	0%	0	0%	9	100%	9
CEFEPIME	0	0%	0	0%	9	100%	9
GENTAMICIN	0	0%	0	0%	9	100%	9
MEROPENEM	0	0%	0	0%	9	100%	9
TOBRAMICIN	0	0%	0	0%	9	100%	9
CEFTAZIDIME	0	0%	1	11%	8	89%	9
CIPRO	0	0%	2	22%	7	78%	9
CEFOTAXIME	3	33%	3	33%	3	33%	9

PSEUDOMONAS SP	**Resistant**		**Intermediate**		**Sensitive**		**Total**
AMIKACIN	0	0%	0	0%	9	100%	9
GENTAMICIN	0	0%	0	0%	9	100%	9
MEROPENEM	0	0%	0	0%	9	100%	9
CIPRO	1	11%	0	0%	8	89%	9
TOBRAMICIN	0	0%	3	33%	6	67%	9
CEFEPIME	4	44%	0	0%	5	56%	9
CEFOTAXIME	4	44%	0	0%	5	56%	9
CEFTAZIDIME	4	44%	0	0%	5	56%	9

E. COLI	**Resistant**		**Intermediate**		**Sensitive**		**Total**
AMIKACIN	0	0%	0	0%	9	100%	9
CEFEPIME	0	0%	0	0%	9	100%	9
CIPRO	0	0%	0	0%	9	100%	9
GENTAMICIN	0	0%	0	0%	9	100%	9
MEROPENEM	0	0%	0	0%	9	100%	9
TOBRAMICIN	0	0%	0	0%	9	100%	9
CEFOTAXIME	0	0%	1	11%	8	89%	9
CEFTAZIDIME	0	0%	1	11%	8	89%	9

COAGULASE-NEGATIVE STAPH	Resistant		Intermediate		Sensitive		Total
VANCO	0	0%	0	0%	173	100%	173
GENT+CEFOTAX*	34	20%			139	80%	173
GENT+CLINDAMYCIN*	40	23%			133	77%	173
CIPRO+CLINDA*	48	28%			125	72%	173
GENT+AMOXCLAVULANAT*	56	32%			117	68%	173
GENTAMICIN	46	27%	10	6%	117	68%	173
CEFOTAXIME**	35	22%	23	14%	104	64%	162
AMOXCLAVULANAT	62	36%	0	0%	111	64%	173
CLINDAMYCIN	60	35%	2	1%	111	64%	173
CIPRO	76	44%	0	0%	97	56%	173
OXACILLIN	145	84%	0	0%	28	16%	173
PENICILLIN	163	94%	0	0%	10	6%	173

STAPH AUREUS	Resistant		Intermediate		Sensitive		Total
AMOXCLAVULANAT	0	0%	0	0%	36	100%	36
CIPRO	0	0%	0	0%	36	100%	36
CLINDAMYCIN	0	0%	0	0%	36	100%	36
GENTAMICIN	0	0%	0	0%	36	100%	36
VANCO	0	0%	0	0%	36	100%	36
CEFOTAXIME**	0	0%	0	0%	35	97%	35
OXACILLIN	2	6%	0	0%	34	94%	36
PENICILLIN	31	86%	0	0%	5	14%	36

STREP VIRIDANS	Resistant		Intermediate		Sensitive		Total
VANCO	0	0%	0	0%	21	100%	21
CLINDAMYCIN	2	10%	0	0%	19	90%	21
CEFOTAXIME	10	48%	2	10%	9	43%	21
PENICILLIN	5	24%	9	43%	7	33%	21

ENTEROCOCCUS FAECALIS	Resistant		Intermediate		Sensitive		Total
AMPICILLIN	0	0%	0	0%	10	100%	10
GENTAMICIN	0	0%	0	0%	10	100%	10
VANCO	0	0%	0	0%	10	100%	10

*: if sensitive to one or the other, otherwise classified as resistant
**: not all isolates tested